

PROJECT PROFILE

INDUSTRIAL ENERGY FEASIBILITY STUDY



Shell Canada Products Limited

Sarnia Manufacturing Centre, Corunna, Ontario

"The Crude Unit #1 study kicked off major energy reduction plans for the Sarnia Manufacturing Centre over the next five years. Improving energy use is key to maintaining Sarnia Manufacturing Centre's longevity and strong competitive position in the industry. We were pleased to start things off with the support and co-operation of the Ontario Ministry of Environment and Energy."

Terry Soeder
Energy Group Leader
Technical Department
Sarnia Manufacturing Centre
Shell Canada Products Limited

THE COMPANY

Shell Canada is a major integrated petroleum and petrochemical company. The Sarnia Manufacturing Centre (SMC), at Corunna, Ontario, is Shell's major refinery in Ontario, manufacturing a wide variety of fuels and chemical feedstocks.

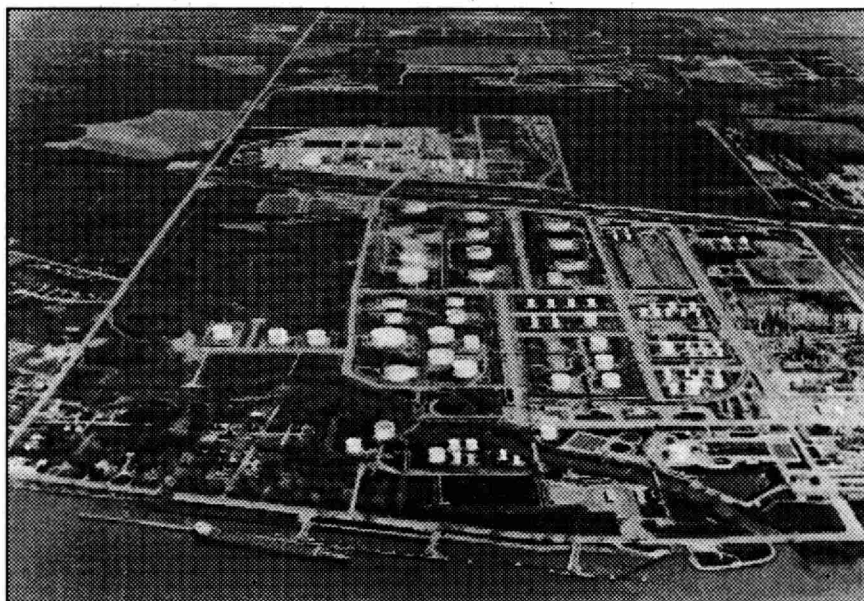
THE CHALLENGE

Like other petroleum refineries, SMC spends a large part of its budget on crude petroleum, the basic refinery feedstock and an important source of energy for refinery processes. In a highly competitive industry, Shell is searching for ways to improve the energy efficiency of refinery operations and reduce air emissions from boilers and furnaces.

OPPORTUNITIES

The #1 Crude Unit is a basic element in any petroleum refinery. This unit distils crude petroleum into many useful products and intermediates, using heating and cooling cycles. A major challenge is to design and operate the #1 Crude Unit to separate crude petroleum into refinery intermediate streams as efficiently as possible.

In 1995, Shell Canada Products and the Ministry of Environment and



Shell Canada's Sarnia Manufacturing Centre is located at Corunna, Ontario, on the Saint Clair River, south of Sarnia.

Energy agreed to a joint study to identify ways to improve the efficiency of the #1 Crude Unit at SMC, which appeared to be using more energy per unit output than similar crude distillation units in other refineries.

Shell identified two general targets for improving the efficiency of the #1 Crude Unit:

- * improve the efficiency of the furnaces, which vaporize volatile components out of the remaining crude oil at the bottom of the unit;
- * improve the efficiency of heat exchange in the many streams going in and coming out of the unit, and in the condenser which condenses the vapors flowing from the top of the distillation towers.

Shell retained the services of three consulting engineering firms to study the feasibility of efficiency improvements. Merritt Process and Research Ltd was asked to investigate heat exchanger improvements while A.J. Atkin Associates looked at increasing furnace efficiency. An overall cost/benefit analysis was done by Kilborn Inc.

RECOMMENDATIONS

The final report of the study included the following recommendations:

- * enlarge and relocate heat exchangers for crude oil pre-heating;
- * increase crude oil pre-heat by reducing heat rejection to cooling water;
- * retire two existing furnaces;
- * install flue gas/combustion air pre-heaters for the two remaining furnaces;
- * increase the effectiveness of heat exchange in the two remaining furnaces;
- * add a new light vacuum distillate section above the existing vacuum distillation column



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POTENTIAL SAVINGS

These recommended improvements were estimated to result in the following savings or reductions:

	Potential annual reductions
* Natural gas consumption	13,000,000 m ³
* Bunker fuel oil use (2.8% Sulphur)	5,000,000 L
* Water and liquid effluent	143,000 m ³
* Sulphur dioxide emissions	280,000 kg

The recommendations would require capital spending of about \$8.5 million, which would be paid back within several years by the savings in operating costs.

PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION

Industrial companies doing business in Ontario may seek ministry/industry services that will help them to:

- * use energy and water more efficiently;
- * reduce, reuse and recycle solid waste;
- * reduce or eliminate liquid effluents and gaseous emissions.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

FOR FURTHER INFORMATION, PLEASE CONTACT:

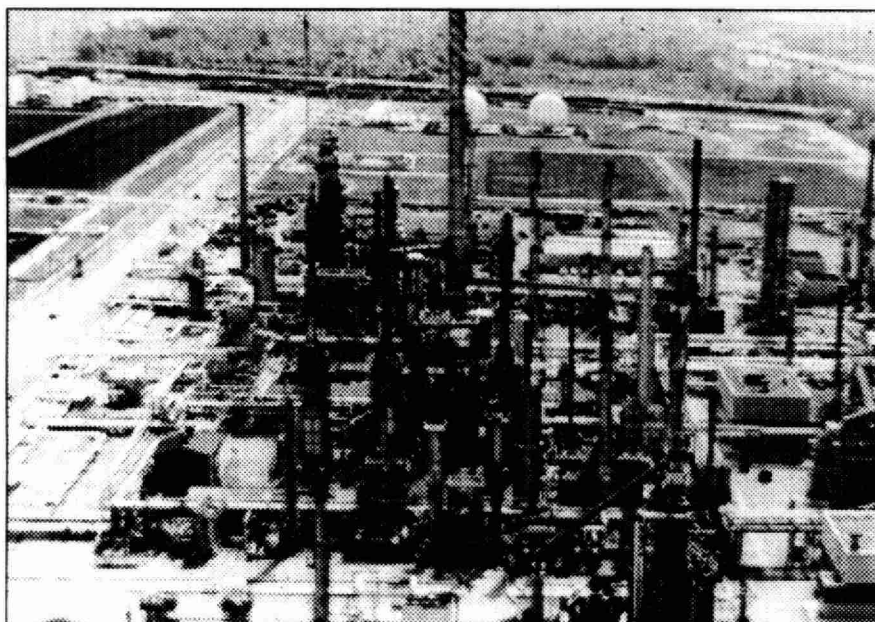
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SMC Refinery

MINISTRY OF ENVIRONMENT AND ENERGY SERVICES

For information on Ministry of Environment and Energy assistance to industry, please contact the Industry Conservation Branch at (416) 327-1492, Fax (416) 327-1261.

This project profile was prepared and published as a public service by the Ontario Ministry of Environment and Energy. Its purpose is to transfer information to Ontario companies about findings and recommendations of a resource conservation and environmental analysis conducted by a consulting engineering firm at an industrial plant in Ontario.

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